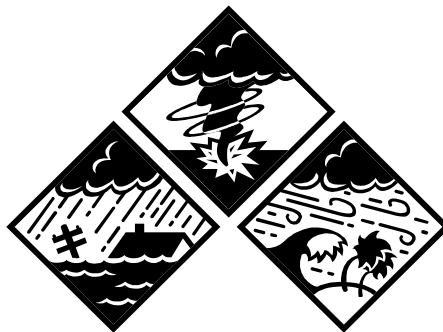




OFFICIAL REPORT

1999 STATEWIDE HOSPITAL AND AMBULANCE GENERAL EMERGENCY READINESS EXERCISE

**STATE OF CALIFORNIA
EMERGENCY MEDICAL SERVICES AUTHORITY**



December 10, 1999

TABLE OF CONTENTS

Acknowledgements.....	1
Contributing Agencies and Organizations.....	1
Executive Summary.....	2
Preface.....	3
Background.....	4
Exercise Structure.....	6
Exercise Development.....	6
Scenario Development.....	7
Exercise Objectives.....	8
Exercise Timeline.....	9
Exercise Results.....	10
Hospital and Ambulance Provider Participation.....	10
Operational Areas.....	10
HAM Radio	11
Regional Level	11
State Level	11
Exercise Operations.....	11
Communications Test and Information Processing.....	11
Hospital Resource Surveys.....	12
Ambulance Service Provider Resource Surveys.....	12
Healthcare Facility and Ambulance Provider Evaluations	12
Performance Critiques and Evaluations.....	24
State Government Critiques.....	24
JEOC and Control Cell Evaluation.....	25
Regional and Operational Area Critiques.....	26
Acknowledgement of Participants.....	26
Recommendations.....	28
Coordination.....	28
Emergency Public Information.....	28
Communication and Communications Technology.....	28
Procedures.....	29
Training	29
Measuring Disaster Contingency Planning Readiness.....	30
California Healthcare Association Y2K Readiness Survey Results.....	30
California Ambulance Association Y2K Readiness Survey Results.....	31
Diagram 1 California Mutual Aid Regions.....	37
Diagram 2 Hospital and Ambulance Data Entry Tracking.....	38

ACKNOWLEDGEMENTS

The following healthcare organizations led the planning and implementation of the 1999 Statewide Hospital and Ambulance General Emergency Readiness Exercise:

- Adventist Health
- California Ambulance Association
- California Healthcare Association
- Catholic Healthcare West
- Healthcare Association of San Diego & Imperial Counties
- Healthcare Association of Southern California
- Hospital Council of Northern and Southern California
- Kaiser Permanente
- Queen of the Valley Hospital
- Sutter Health
- Tenet Healthcare Corporation

CONTRIBUTING AGENCIES AND ORGANIZATIONS

The following government organizations and volunteers helped make this exercise successful:

- Emergency Medical Services Authority
- Regional Disaster Medical/Health Specialists
- Department of Health Services
- Governor's Office of Emergency Services
- Office of Statewide Health Planning and Development
- Department of Veterans Affairs (Federal Government)
- Contra Costa County EMS Agency
- San Mateo County EMS Agency
- Sierra-Sacramento EMS Agency
- Los Angeles County EMS Agency
- State and Local Government RACES Organization (HAM Radio)
- State CARES Organization (HAM Radio)

EXECUTIVE SUMMARY

On September 16, 1999, the Emergency Medical Services Authority (EMSA) participated in the healthcare industry Statewide Hospital and Ambulance General Emergency Readiness Exercise. The goal of this first-ever statewide disaster readiness exercise was to provide an opportunity for participating acute care facilities and ambulance service providers to assess the readiness of their contingency plans and general emergency preparedness, and for these organizations to coordinate with government agencies to jointly assess emergency communication linkages. EMSA, the Department of Health Services (DHS), and the Governor's Office of Emergency Services (OES) actively facilitated an eight-month private-public partnership to enable this groundbreaking effort. Some 425 acute care hospitals, 273 private ambulance companies and 186 public ambulance services were invited to participate. The volunteer exercise participants included 405 healthcare facilities and 101 ambulance service providers. There was also participation by disaster medical and health coordinators at the county, region, and State. In addition, for the first time, amateur radio volunteers supported simultaneous statewide hospital communications in a disaster exercise. It is important to note that every participant in the exercise came to the activity voluntarily. There were no regulatory or legal requirements for mandatory participation in this particular exercise.

Information coordination was a major activity in the exercise. Both the Internet and amateur radio communications were evaluated for the capability to transmit key healthcare resource data to government during a disaster. The Department of Information Technology (DOIT) provided crucial funding and support to allow for this component of the Exercise. Though the scenario for this exercise had a Y2K basis, there were many elements in the test related to a variety of natural disaster consequences, including loss of utilities, hazardous materials incidents and hospital overcrowding due to seasonal flu outbreaks.

The EMSA and DHS are dedicated to improving the accessibility and quality of healthcare needed in California following a disaster. Part of that commitment is supporting the ability of the healthcare community to respond effectively in a disaster. The lessons learned from this exercise will be used to further improve operation of both the private and public sector healthcare services.

The overall findings were:

- Resource information can be collected using the Internet system designed for the exercise.
- Amateur Radio can be used as a reliable back-up methodology for transmitting resource data.
- Efforts need to continue to bring more of the private sector and public sector elements together to prepare for disaster response.
- Protocols need to be developed to improve communications during disaster.
- Data content and collection approaches need refinement.

PREFACE

The possible challenges of Y2K, a pandemic flu outbreak, and a large regional earthquake all offer the potential for severe impacts to healthcare operations in California. Attention was drawn to hospital disaster preparedness in 1998 when national leaders portrayed hospitals as one of the highest risk institutions for failure during Y2K interruptions. Without appropriate disaster coordination and planning these risks could lead to reduction in healthcare services during disasters.

To ensure that critical government resources are used efficiently and effectively during disasters in California the Standardized Emergency Management System (SEMS) was developed. SEMS serves as a statewide template for disaster response. SEMS coordination activities have already addressed a number of healthcare vulnerabilities encountered in the late 1990s.

In late December of 1998, discussion began between EMSA and the California Healthcare Association (CHA) on the benefit of a statewide exercise to further strengthen disaster planning in the California healthcare community. The exercise would evaluate disaster contingency plans using a Y2K scenario in combination with events common to many disasters. This scope of exercise, by both content and participation, had never been attempted before in California, and had not been attempted with this level of complexity anywhere in the United States. After approvals to proceed in January of 1999, and with funding support from the DOIT, EMSA and CHA initiated the planning efforts for an exercise to be performed in less than eight months. This was a gargantuan undertaking since smaller, less-complex exercises normally take two full years of planning to implement.

In emergency management, there are four factors that are crucial to ensure such large-scale exercises are successful. These are often referred to as the 4 Cs:

- Cooperation
- Coordination
- Communication
- Collaboration

The Statewide Hospital and Ambulance General Emergency Readiness Exercise would not have been possible without successful application of all four of these elements. The cooperation between the private and public sector participants was a tremendous success. The alliances forged in the coordination stage will help strengthen actual response efforts during any future disasters. In addition, the new communications bridges that resulted from the exercise planning and coordination now promise to speed and clarify crucial information sharing. This all occurred within the context of volunteerism. Not a single participant was required to engage in the exercise. This was also a groundbreaking approach to disaster exercise development. However, without the substantial financial support from the Department of Information Technology, the building of the technological bridges would not have been impossible.

BACKGROUND

Healthcare in California

In the past, the healthcare community in California was a balance of public and private operations. Today, the great majority of acute care hospitals and ambulance service providers are privately operated. This creates a challenge in disaster response coordination for government, since these resources are no longer under government direction. Regardless of this fact, government still has the responsibility for ensuring healthcare services are not unreasonably interrupted.

In order to ensure the continuity of healthcare services after disasters, California developed a variety of government organizations and agencies to support healthcare preparedness. At the State level, the EMSA, the DHS, and the Office of Statewide Health Planning and Development (OSHPD) work together to support and regulate healthcare industry activities.

At the Regional level, a team of six Regional Disaster Medical/Health Specialists (RDMHS) was established to provide consistent approaches to disaster medical and health planning in each of the six Mutual Aid Regions (Diagram 1). The Local Emergency Medical Services Agencies (LEMSA) and local health departments further support them. The LEMSAs coordinate activities with local healthcare facilities, ambulance service providers and local health officers.

The past performance of this government structure has been mixed, especially during disaster response, partially due to the lack of clear, consistent communications protocols. Efforts continue to improve these lines of communication in order to improve public service. Exercising disaster communications is one method to strengthen healthcare preparedness.

Healthcare Organizations Prepare Year Round for Disaster

Acute care hospitals are required to keep their emergency contingency planning processes up-to-date. Regular tests of these capabilities are required as part of their accreditation process through the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). JCAHO requires two disaster exercises per year. At least one exercise yearly must include an influx of volunteer or simulated patients. Tabletop exercises, though useful in planning or training, are not acceptable substitutes for a functional exercise. The purposes of an exercise is to:

- Foster individual and departmental investment in the disaster plan;
- Educate staff;
- Help staff rehearse their skills;
- Develop solutions to problems;
- Validate staff's progress in preparedness; and
- Improve the disaster plan.

Ambulance services, both private and public, regularly participate in local community disaster exercises.

How Can Y2K Impact Hospitals and Ambulance Providers?

Healthcare may be impacted by Y2K because hospitals and ambulance service providers rely on thousands of medical devices and pieces of equipment to serve patients. In addition, they use computer software to perform administrative functions, such as payroll, purchasing, billing and credentialing. Computers also control many physical plant and building systems, such as elevators and security systems, and HVAC systems. External support such as electrical power, phone and paging services, water, and supplies may also be affected. Every day healthcare facilities rely on a variety of outside organizations and companies, such as medical suppliers and vendors, in order to deliver care. These services may also be affected by Y2K rollover problems.

Hospitals and ambulance providers are keenly aware of these challenges. They have taken many steps to prepare for the millennium bug, which have typically included:

- Establishing a Y2K project team led by a senior member of management.
- Researching Internet databases for background information.
- Preparing an inventory of Y2K-affected equipment, computers and software.
- Obtaining equipment-compliance information from manufacturers and vendors.
- Testing *all* devices and equipment (not just a sampling) and taking the appropriate steps to repair or replace if necessary.
- Communicating and working with manufacturers and vendors to repair or replace non-compliant equipment, computers and software.
- Subscribing to device-tracking and notification services that will provide status changes on device compliance.
- Developing a repair and/or replacement plan to deal with non-compliant devices, equipment, and computer hardware and software developed or modified by the hospital or healthcare system.
- Preparing an internal action plan to deal with potential malfunctions on or about Jan. 1, 2000;
- Establishing a central file to document the hospital's or healthcare system's Y2K process and all related communications.
- Establishing a contingency plan to prepare for unforeseen circumstances and working with other community sectors (i.e., public utilities, transportation, water supply, etc.) to ensure disaster readiness from all perspectives, including Y2K.

Some Medical Devices are Mission Critical

To ensure the seamless delivery of healthcare services and to help prevent any interruption in patient care, hospitals and ambulance service providers have focused first on areas identified as "mission critical" -- those that could potentially endanger life or health. Some medical devices, in particular, fall into the mission-critical category. Examples include defibrillators, fetal monitors, ventilators, heart-lung machines, cardiac monitors and other life-support equipment.

Hospitals and Ambulance Service Providers Needed to Revise Their Contingency Plans

Even with this level of technological preparation, it was clear that hospitals and ambulance providers needed to focus on contingency planning. Given the complexity of healthcare facilities, some organizations may not have found and fixed all Y2K bugs. This meant that hospitals and ambulance service providers needed to develop action plans for responding to the potential loss of any essential processes or services. These efforts needed to be directed both internally and externally within communities, to include utilities, fire, police, ambulance services and other healthcare providers.

In order to improve coordination with local government, healthcare providers worked with cities and counties to implement emergency operation plans. Hospitals reviewed their crisis communications and disaster preparedness plans to ensure they would work as well in a Y2K emergency as they would in other emergencies, such as severe weather or major accidents. It is highly unlikely Y2K will cause a catastrophic impact in California or the rest of the nation. However, there is some potential for facility, local or regional impact that will affect hospital operations and communications. It is clearly imperative that hospitals and ambulance providers prepare up-to-date disaster plans and ensure that employees are well informed regarding how to respond to any type of disaster.

EXERCISE STRUCTURE

Exercise Development

An Exercise Steering Committee was formed in March of 1999 to address the need for an appropriate exercise to test the healthcare community and its communications with government. The membership included representatives from major hospital groups, healthcare associations, and interested organizations from all levels of government. The committee developed the tools necessary to organize both the public and private sector exercise participants. These products included guides for both hospitals and ambulance providers, scenario packages, guides for local government, a communications guide for public information, and operational information for an Internet-based government data collection system called NetRIMS, as well as for amateur radio operations. Exercise information was also provided through the EMSA website to ensure that all participants received consistent guidance.

To ensure that the communications portion of the exercise was adequately designed, two subcommittees were established. The first subcommittee worked on the development of NetRIMS and the display of NetRIMS data on the EMSA website. This concept was important since NetRIMS was accessible only to government. Data displayed on the EMSA website enabled the private sector to access disaster information in order to evaluate the impact on their neighboring communities. The amateur radio subcommittee helped establish the forms, protocols and technical operation details necessary to build a backbone of communications between the hospitals and government. Both subcommittees met weekly from July through the first week of September in order to complete their tasks under the tight schedule. In order to test the capability (not capacity) of HAM Radio, a test county was selected in each mutual aid region:

Region I	Ventura County	Region II	Humboldt County
Region III	Shasta County	Region IV	Stanislaus County
Region V	Fresno County	Region VI	Riverside County

Operational Areas (counties) also helped to coordinate local activities, along with the OES Regional Administrative offices. These organizations worked with the RDMHSs to coordinate the local healthcare community planning efforts in accordance with information and direction from the Exercise Steering Committee. Planning was supported through published exercise guides, local government exercise operations instructions, and a communications guide to address media and public interest. Local government was also the critical communications focal point for using the Internet (NetRIMS) and the transmission of data via amateur radio volunteers.

State agencies also had specific planning responsibilities. The primary role of state government was to develop and test communications systems used to gather resource information from hospitals and ambulance service providers during a disaster. From July through September, EMSA, DHS and OES designed an Internet framework that would be used to collect information from Operational Areas, to go to the RDMHSs, and simultaneously to the State's Medical and Health management function at the Joint Emergency Operations Center (JEOC) in Sacramento. The primary role for State government during the exercise was to monitor the use and capability of this "NetRIMS" system. NetRIMS was based on the Response Information Management System (RIMS), the backbone communications tool for SEMS.

Scenario Development

The basic scenario, as developed by the Steering Committee, was as follows:

"It is December 31, 1999. The governmental infrastructure in California has been working for the past two years on problems that may result from computer systems that have not been enhanced to account for a four-digit year (i.e. 2000). The State, regional, and counties' Emergency Operations Centers have been activated. Television and radio stations are being monitored closely by disaster coordinators to track the Y2K problems occurring in other states and cities throughout the country. California has the advantage that January 1, 2000 has been celebrated 18 hours earlier in Australia, 3 hours earlier in New York City, and 2 hours earlier in Chicago."

Following the opening briefing, players were to be given the California section of the scenario:

"A rolling brown out has occurred throughout California beginning at midnight. Power companies are unable to identify the specific cause and do not know how long this situation will continue. While they hope to have the problem resolved within the next several hours, it could persist in some areas for as much as 72 hours. Many hospitals are on emergency generators. Many of the smaller cities' Public Service Answering Points (PSAPs) 9-1-1 have malfunctioned. Response delays are occurring for both fire and police. Additional reports have arrived that numerous airports have grounded outgoing flights from major airports in each county. Incoming flights are being re-routed to Las Vegas until the weather system passes. Telephones, cellular phones, and Internet communication systems are sporadically going out due, presumably, to extreme weather conditions. There have been reports of isolated hazardous materials releases from manufacturing plants throughout the State due to non-Y2K-compliant computer systems."

“A significant number of hospitals that rely on computerized registration in the emergency department and for ordering laboratory tests are reporting computer failures. Telephones are working sporadically, making it difficult to reach specialists on the on-call panel. Many hospital personnel are bringing younger children to work because of the brown out conditions. Police and rescue personnel are arriving at hospitals unannounced with injured partygoers. Some hospitals are reporting elevator failures. Hospitals are experiencing an influx of patients due to several factors: the flu season is at its height, multiple traffic accidents and injured Y2K partygoers, and local skilled nursing facilities are evacuating because of loss of power. Most hospitals had anticipated supplies needed for the long holiday weekend, but some are concerned that supplies are being used faster than normal because of the heavy influx of patients.”

Each Operational Area was encouraged to add materials that made the basic scenario relevant in their communities.

At 2:00 p.m., the participating organizations were to initiate the following additional scenario to their timelines:

“Hospitals are advised that due to these major incidents occurring throughout the city, they must provide authorities with the status of their facility and bed availability.”

Exercise Objectives

Based on these general scenarios, each segment of participants was to perform specific objectives. In general, hospitals and ambulance providers were to focus on three areas in their exercise preparation: 1) medical devices and clinical equipment; 2) information systems; and 3) physical plant and infrastructure. They were also tasked to use various methods to communicate with local government during the exercise.

Healthcare facilities were to perform the following core elements :

- Activate and implement disaster plan.
- Power outage--either short or long-term.
- Telephone outage--short or long-term.
- Loss of at least one computer system or computer network within the facility.
- Influx of patients/overcrowded facility.

Ambulance service providers were to perform the following core elements:

- Implement the disaster plan.
- Assess the backup generator system.
- Utilize alternative communications (other than telephones) to reach ambulance crews, the County Emergency Operations Center and hospitals.
- Assess backup systems or techniques to handle potential problems associated with at least one computer system critical to operations.
- Assess the ability to respond to a large influx of patients and subsequent hospital overcrowding with patient redirection.

Both hospitals and ambulance providers had the option to incorporate the following optional elements if there was time to extend play:

- Respond to contaminated patients or hazardous material spills.
- Identify personnel to address additional Y2K issues.
- Establish alternative communications between ambulance personnel and health facility.
- Determine if there are any possible insufficiencies of critical supplies.
- Consider operations and support for patient evacuations (due to internal facility disaster).

The core objectives for government consisted of the following elements, although local scenarios incorporated additional activities:

- Evaluate the use of NetRIMS to collect and transmit healthcare resource data and status information.
- Evaluate the use of amateur radio to transmit healthcare resource data and status from counties to the RDMHS, and then to the State at the JEOC.
- Re-format healthcare data and place on EMSA website for medical participants to monitor.
- Participate in limited operations of the JEOC.

Exercise Timeline

The exercise started formally at 8:00 a.m. The first planned event was ambulance service providers surveying their resources. This survey data was then sent at 8:30 a.m. to a county contact designated for the exercise. At 8:00 a.m. the hospitals surveyed their bed resources. The hospital survey data was sent at 10:30 a.m. to the county.

The county contact then entered the information on the NetRIMS Internet system designed specifically for the exercise. Once on NetRIMS, the data was reformatted by OES and transferred to EMSA technical staff. EMSA staff then placed the current data on their website so that the private sector and public could see the current data.

Between 10:00 a.m. and 3:00 p.m., amateur radio volunteers in the designated test counties began sending the morning surveys from ambulance service providers and the hospitals to a county amateur radio contact. The amount of data to be transmitted by HAM radio was limited to specific sections of the survey forms, and by the number of counties selected to perform the test. This allowed the participants to test the use of amateur radio in each Mutual Aid Region, without an overwhelming volume of information. The counties received the radio transmissions and then sent the data to the RDMHS. This allowed regional assessment of healthcare resource needs. During an actual disaster, the RDMHS could work through SEMS to coordinate mutual aid resources within the Mutual Aid Region, or request resources outside of a Region. During the exercise, the RDMHSs worked with amateur radio volunteers to transmit the survey data to the California Amateur Emergency Radio Service (CARES) station serving the JEOC in Sacramento. Radio traffic was also monitored and assisted by the Radio Amateur Civil Emergency Service (RACES) professionals, and by hundreds of HAM volunteers throughout the State working with hospitals and counties.

At 2:00 p.m. the hospital participants sent new survey data. This data was based on bed counts following the implementation of their disaster scenarios. It was transmitted to the designated county coordinator using a method other than telephone. This data was then entered into NetRIMS. There was no afternoon ambulance survey scheduled for this exercise.

EXERCISE RESULTS

Hospital and Ambulance Provider Participation

The Plans and Intelligence Section in the JEOC tabulated NetRIMS data during the exercise. Some 425 acute care hospitals, 273 private ambulance companies and 186 public ambulance services were invited to participate. Data was eventually received from 405 healthcare facilities and 101 ambulance companies. This was an outstanding level of participation in a volunteer exercise. In addition, representatives from the blood banks in California asked to participate. This was an important request, proving that the exercise was drawing more of the healthcare industry to the table. Some blood banks transmitted information by HAM radio during the exercise. In future exercises, representatives from the blood banks as well as other health care providers may also play key roles in the exercise design and implementation.

The distribution of participating ambulance providers was statewide by both county and region as summarized below (Note that many counties are served by just a few ambulance providers):

Alameda - 1	Madera - 1	Santa Cruz - 1
Amador - 1	Marin - 1	Shasta - 2
Butte - 3	Mendocino - 7	Sierra - 2
Calaveras - 3	Merced - 1	Siskiyou - 2
Colusa - 1	Modoc - 2	Solano - 2
Contra Costa - 6	Monterey - 3	Sonoma - 9
El Dorado - 1	Nevada - 1	Stanislaus - 3
Fresno - 1	Plumas - 3	Sutter - 1
Humboldt - 7	Sacramento - 1	Trinity - 1
Imperial - 1	San Bernardino - 2	Tulare - 1
Kern - 9	San Diego - 1	Tuolumne - 1
Kings - 1	San Joaquin - 3	Ventura - 4
Lake - 2	San Luis Obispo - 3	Yolo - 1
Lassen - 2	San Mateo - 1	
Los Angeles - 1	Santa Clara - 2	
Region I - 8	Region III - 19	Region V - 14
Region II - 42	Region IV - 15	Region VI - 4

Operational Areas

56 of 58 Operational Areas participated in the exercise. Their primary role was to coordinate the healthcare participant efforts for planning and participating in the exercise. Local government was also a critical communications point for both Internet input (NetRIMS) and the transmission of data via amateur radio volunteers.

HAM Radio

The amateur radio community made a tremendous effort to support the objectives of the exercise. HAM operators supported communications from select hospitals to the six designated Operational Areas, to the RDMHSs, and then to the State at the JEOC. In addition, a number of Operational Areas developed additional HAM radio operations at other hospitals. This support was used to fulfill the exercise objective to transmit information by a means other than telephone. Statewide, it is estimated that hundreds of volunteer radio amateurs participated. Their use of amateur radio extended from 10:00 a.m. to 3:00 p.m.

Regional Level

The RDMHSs, as noted earlier, performed critical training and coordination functions with Operational Area designated medical coordinators and with the healthcare community. During the exercise the RDMHSs monitored the entry of Operational Area input in NetRIMS, and at times entered it for those Operational Areas that had problems with access or use of the Internet. The RDMHSs also monitored and assisted with the HAM radio transmissions, and served as the facilitators for follow-up critiques with the Operational Areas. An 11:00 conference call was held to simulate similar calls held in past disasters to assess the status of all Mutual Aid Regions.

The Governor's Office of Emergency Services also supported coordination at the Regional Level. Representatives from the three OES Administrative Regions facilitated HAM radio coordination with county OES offices. This effort was critical for successful operations during the communications test.

State Level

During the exercise, EMSA and DHS staffed the Joint Emergency Operations Center. In addition, EMSA and DHS developed a Control Cell to assist participants with technical problems during the exercise. The Control Cell focused most of its attention on questions about data entry, access to the Internet, computer settings, database errors, entries in NetRIMS and HAM radio operations.

EXERCISE OPERATIONS

Communications Test and Information Processing

The use of NetRIMS for exercise communications started almost immediately at 8:00 a.m. and continued through the end of the exercise at 3:00 p.m. A chart of NetRIMS entries is provided as Diagram 2. Additional entries were received following the exercise, which increased the final count. The ability to enter and compile data was quickly proven. In that regard, the test was a complete success. Difficulties occurred when those entering data either misunderstood or had not received the appropriate training for changing data entries.

Amateur radio communications to the JEOC began at 10:00 a.m. and continued through 3:00 p.m. The ability to transmit critical resource information from each mutual aid region proved successful. In that regard, the test was a complete success. Difficulties occurred when some RDMHSs transmitted from their offices, and not from well-established amateur radio sites in a county Operational Area. There were a number of interruptions caused by misunderstandings of the use of certain frequencies and transmitters. It was clear that HAM radio can perform a major role in assisting the healthcare community during disasters, but better protocols and training are needed to ensure this process is more effective and without disruption. The amateur radio community and the healthcare facilities are very interested in continuing the work started in the exercise, to ensure that such a system is in place to support an actual disaster response effort.

Hospital Resource Surveys

An 8:00 a.m. a survey of bed resources was performed by the participating healthcare facilities. The survey did not include all healthcare facilities. However, 405 of the 454 healthcare facilities recognized as resources in disaster management did provide information (almost 90% participation). These final participant numbers were adjusted due to late entries received by fax. The survey provided a unique snapshot of the resources that were available during actual conditions on a particular average workday in California. The survey totals do not represent all of the state healthcare resources, just those of the participating facilities. Some of the data is summarized graphically on the following pages.

The most important aspect of the survey is that it could be done. Critical survey information during disasters, even in the recent past, have been difficult to acquire at the Regional and State level, even after a day or two has passed. In this scenario, participants were able to provide timely data statewide within hours, and some within the first hour after the survey was completed.

Ambulance Service Provider Resource Surveys

101 ambulance service providers submitted surveys of their ambulance resources as of 8:00 a.m. The data was limited. Significant analysis could not be developed from the resulting reports. However, NetRIMS proved capable of collecting the data. Some data input quality issues may have been caused by a lack of direct training. Extensive training could not be provided before the exercise due to time constraints.

Healthcare Facility and Ambulance Provider Evaluations

Healthcare facilities and ambulance providers were asked to complete exercise evaluations as part of the exercise process. The purpose of the evaluations was to have a record of how many of the core objectives and ancillary activities were performed during the exercise. The results of the healthcare facility evaluations are summarized in the figures on the following pages.

Healthcare facilities

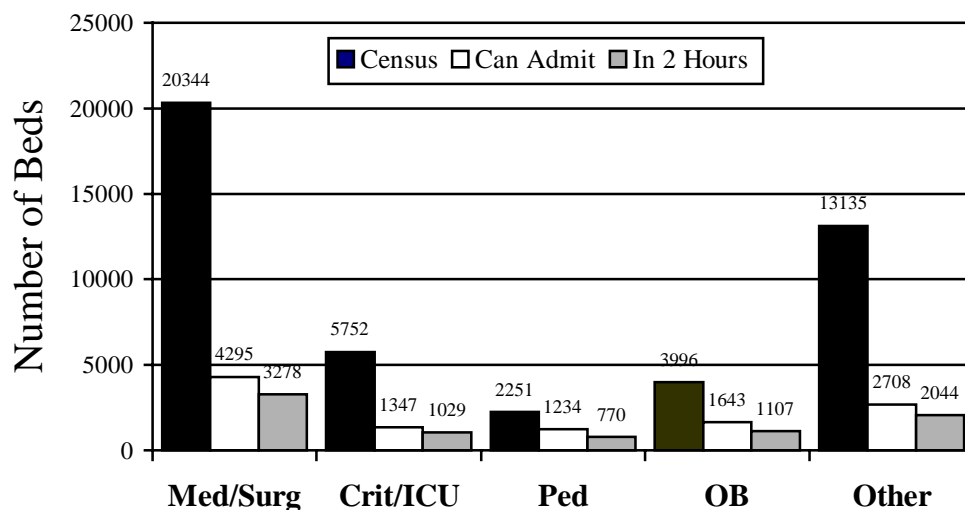
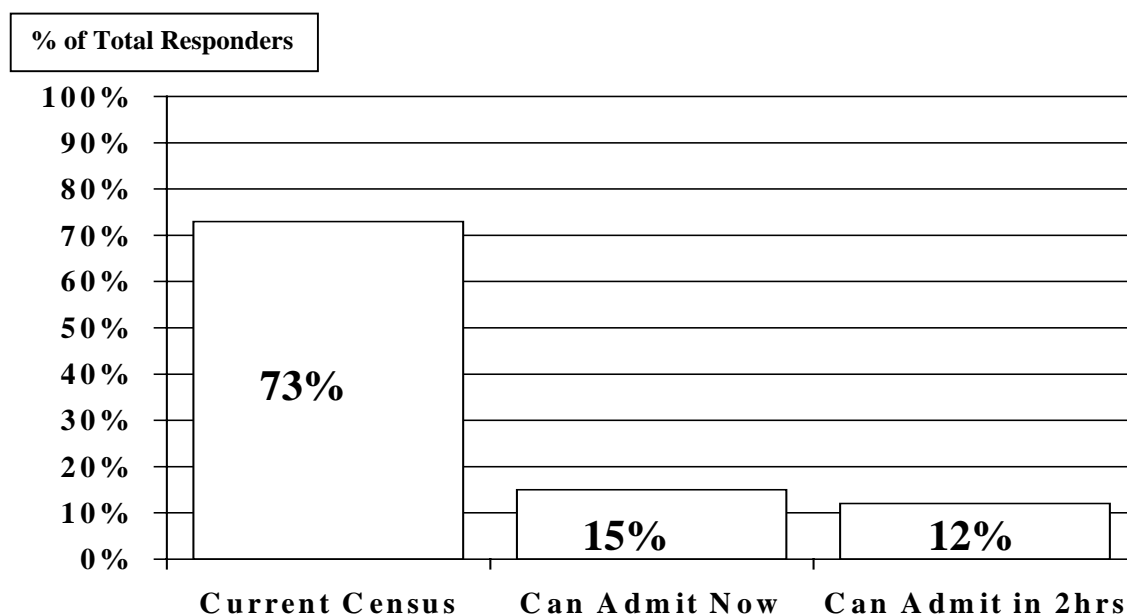
The following is a summary of the results from the healthcare facilities:

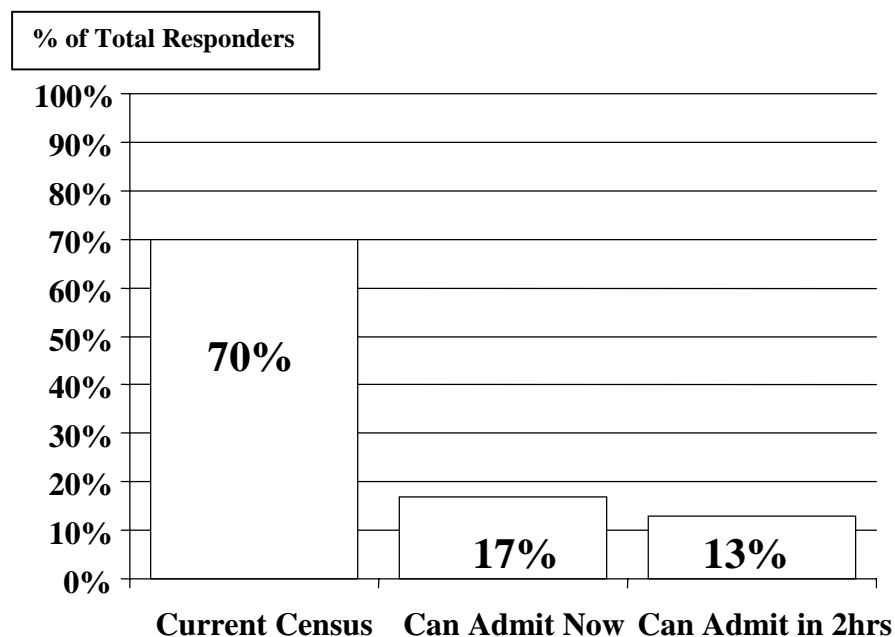
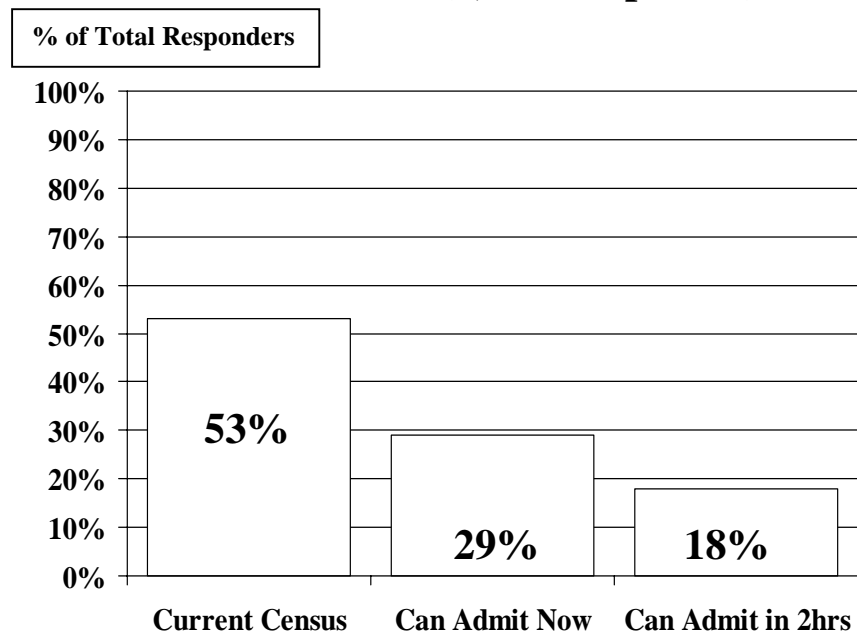
- Of all the healthcare facilities participating, almost 80% provide acute care.
- Almost 65% of the facilities held functional exercises.
- At least 95% activated their emergency plans and almost the same number used HEICS.
- Almost 90% tested their backup generators while about 95% used alternate communications.
- About 88% simulated computer failures (in accordance with a Y2K-based scenario).
- Over 90% simulated overcrowding based on many potential conditions, including flu season.
- A little over 10% actually practiced decontamination of patients, based on the hazmat scenario.
- Almost 100% of the facilities had Y2K staffing lists in place.
- About 50% used alternative communications with ambulance service providers.
- A little over 50% of the participants evaluated a shortage of supplies.
- A little over 10% actually simulated the evacuation of patients.
- Almost all participants were satisfied with the outcome of the exercise.

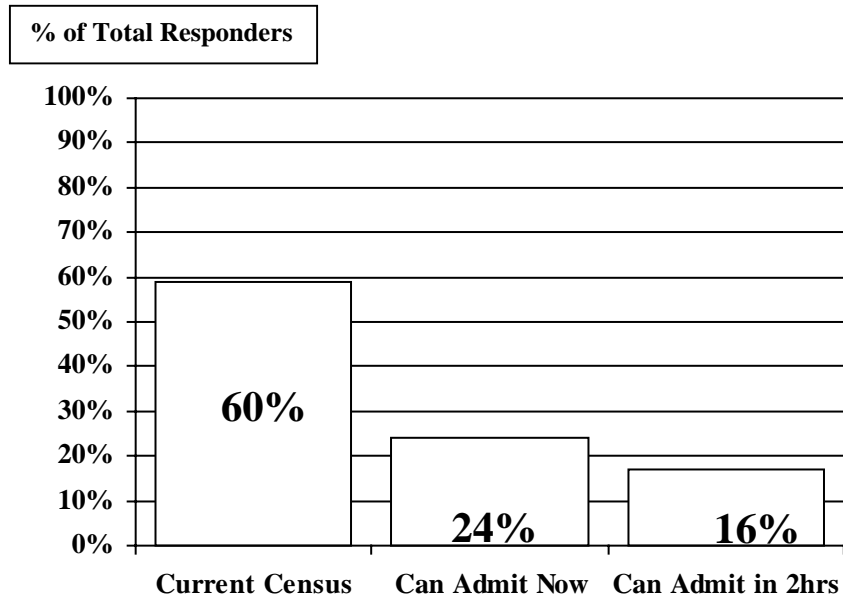
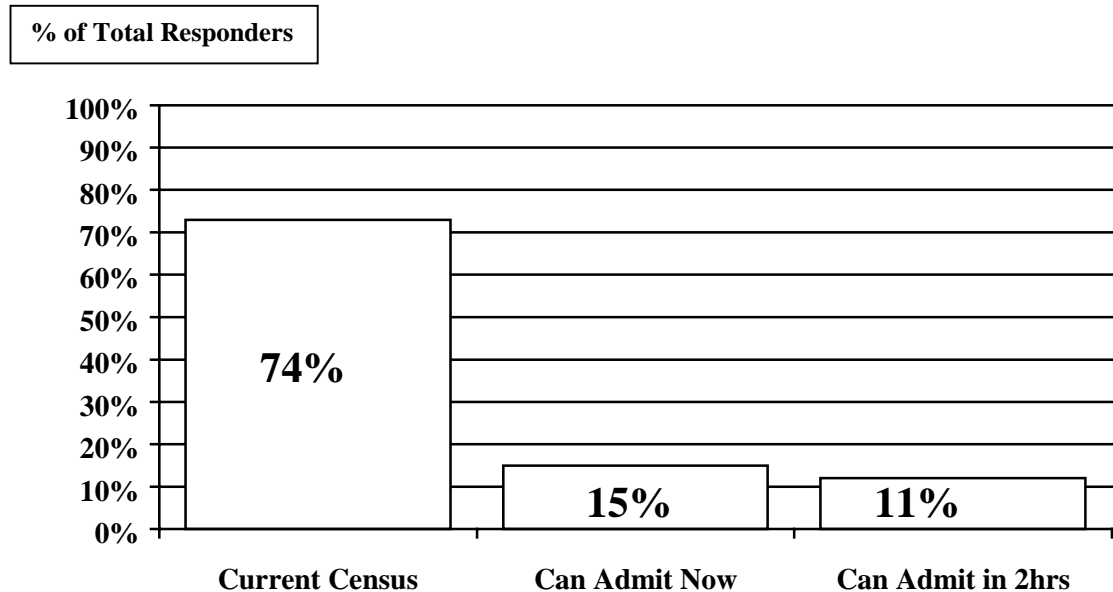
Ambulance Service Providers

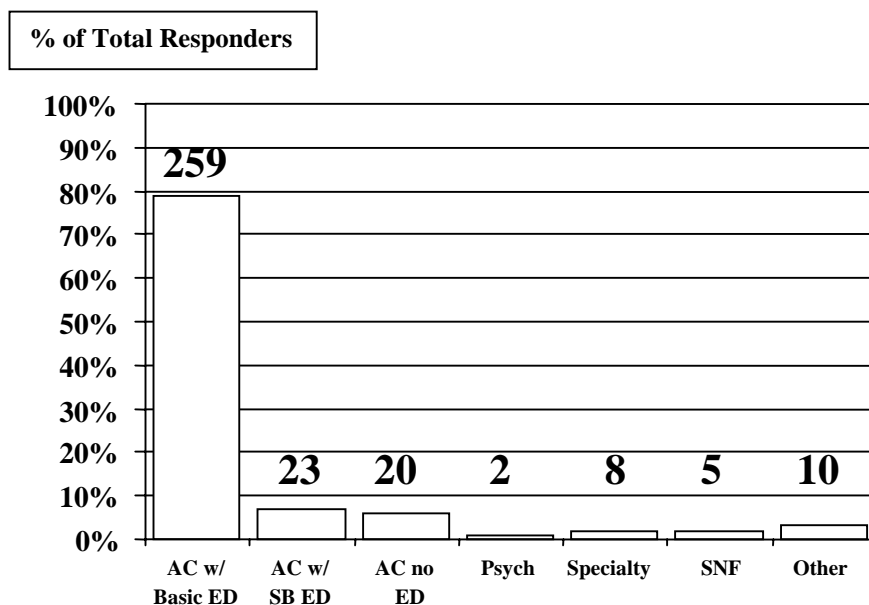
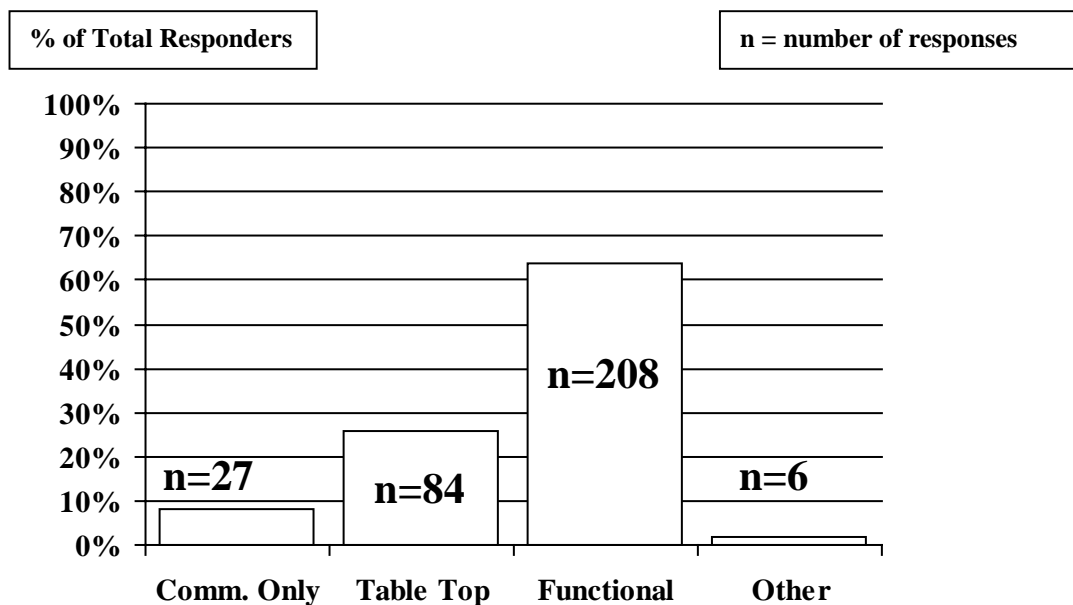
There were 31 exercise evaluations returned from ambulance providers. A summary of highlights from the evaluations is provided below:

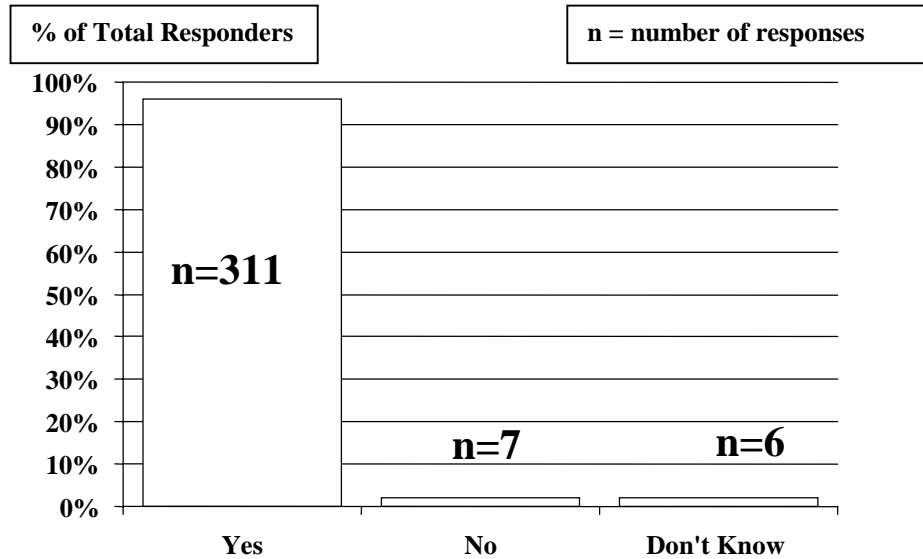
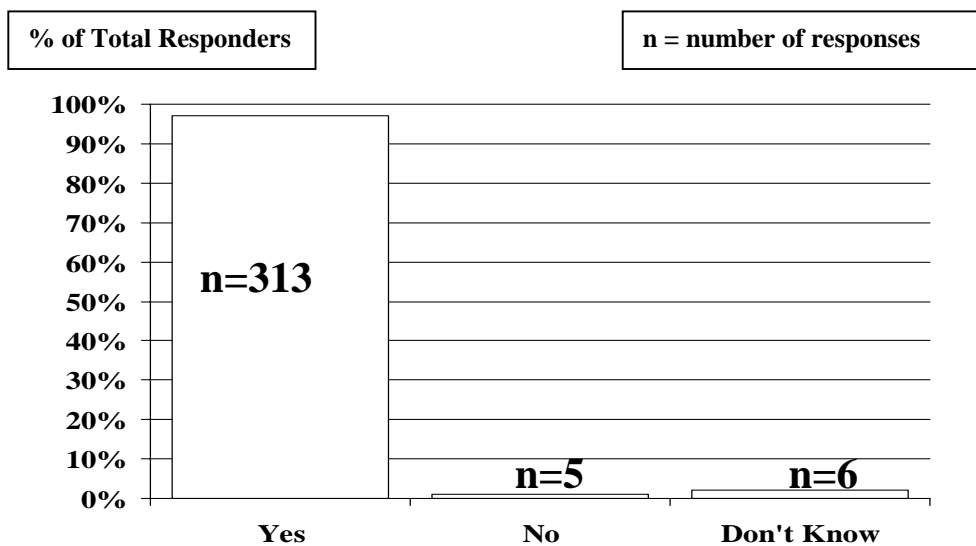
- All of the Mutual Aid Regions were represented, with the most being from Region II (11).
- About 2/3 of all respondents had both BLS and ALS ambulances.
- 58% of the respondents were privately operated, the rest were a mixture of government and hospital associated services.
- About 1/3 of the respondents held functional exercises, while another 1/3 held tabletop exercises.
- 61% of the respondents activated their contingency plans.
- 58% tested their backup generator under load.
- 81% tested an alternative communications method between their ambulances and hospitals, and
- 67% established these alternative communications.
- 58% simulated the loss of their primary computer system operations.
- 55% simulated overcrowding in hospitals that required ambulances to assist with diversion.
- 10% of respondents simulated any type of contaminated patient scenarios.
- 94% had already prepared a list of additional personnel to call for Y2K event impacts.
- 36% simulated supply shortages, while 26% simulated requesting supplies from medical vendors.
- 36% simulated support of hospitals for patient evacuation.
- 100% were satisfied with the exercise, and 87% want to participate in the future.

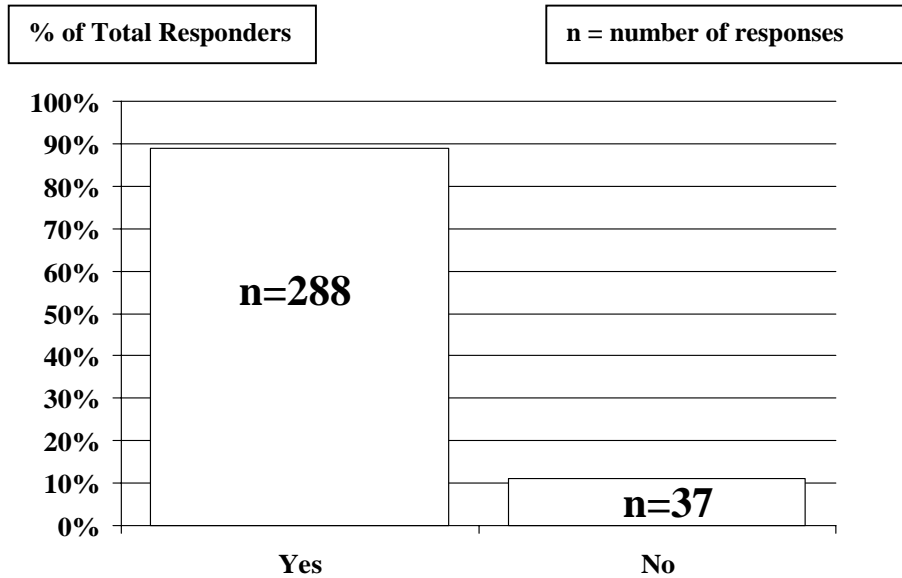
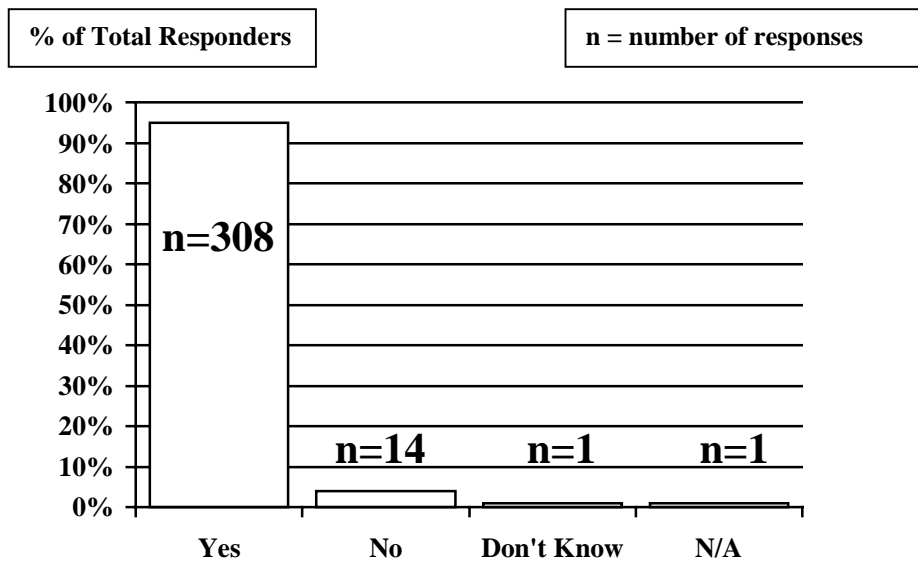
HOSPITAL RESOURCE SURVEYS**Available Beds
Sum of All Responding Facilities****Percent Available Beds
Medical and Surgical (27, 917 responses)**

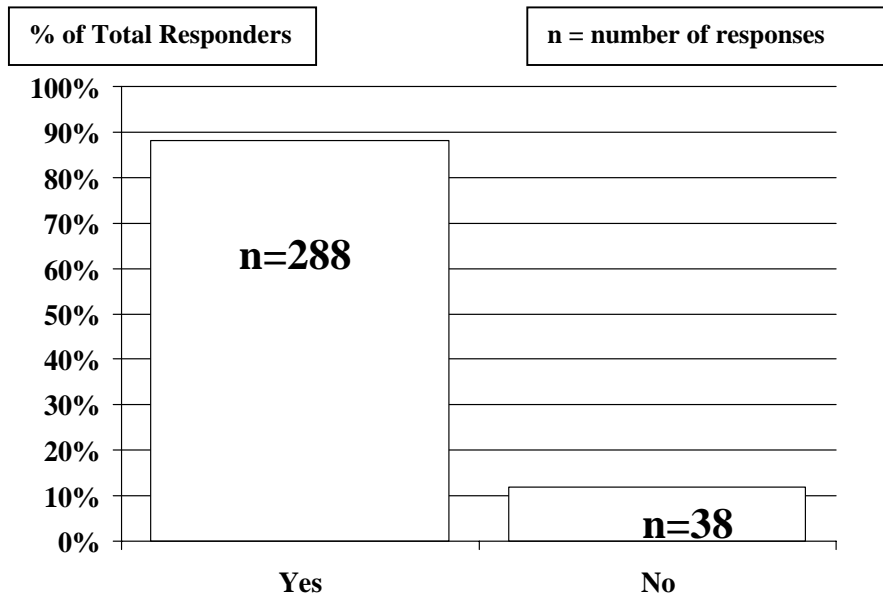
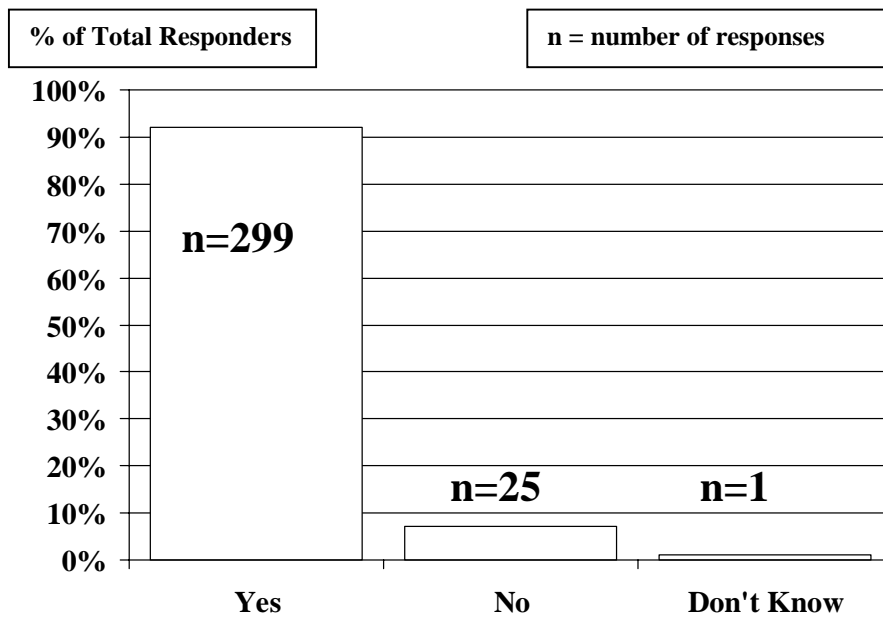
HOSPITAL RESOURCE SURVEYS**Percent Available Beds
Critical Care And ICU (8, 128 responses)****Percent Available Beds
Pediatric (4, 255 responses)**

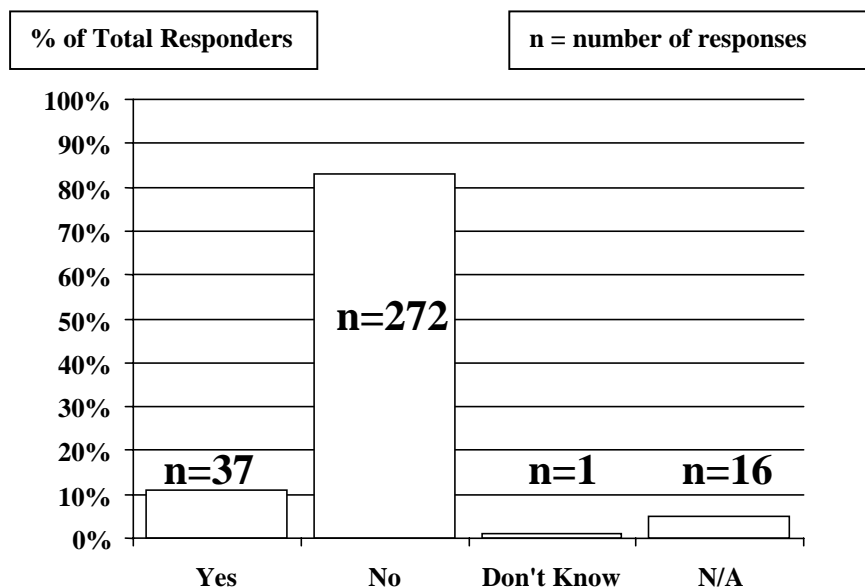
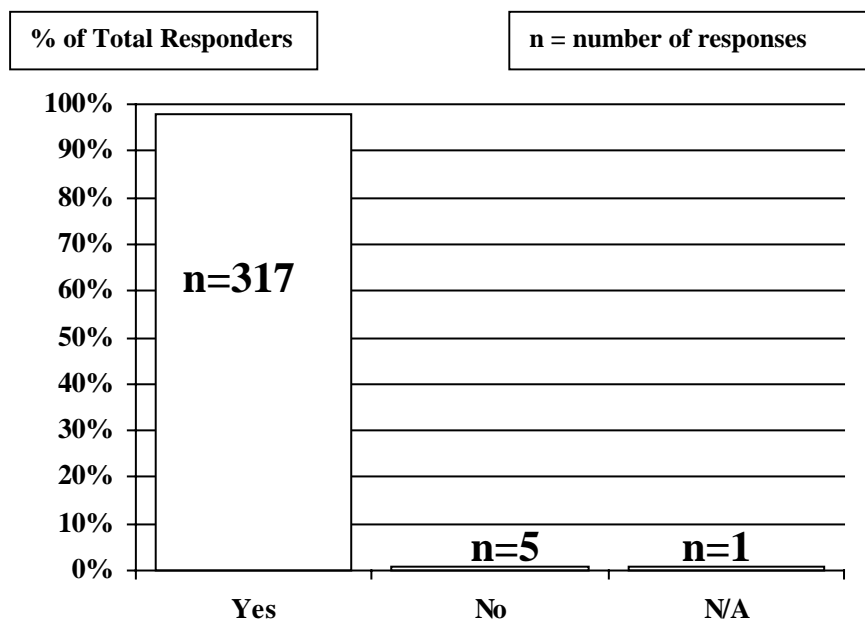
HOSPITAL RESOURCE SURVEYS**Percent Available Beds
Obstetrics (6, 746 responses)****Percent Available Beds
All Other Types (17, 887 responses)**

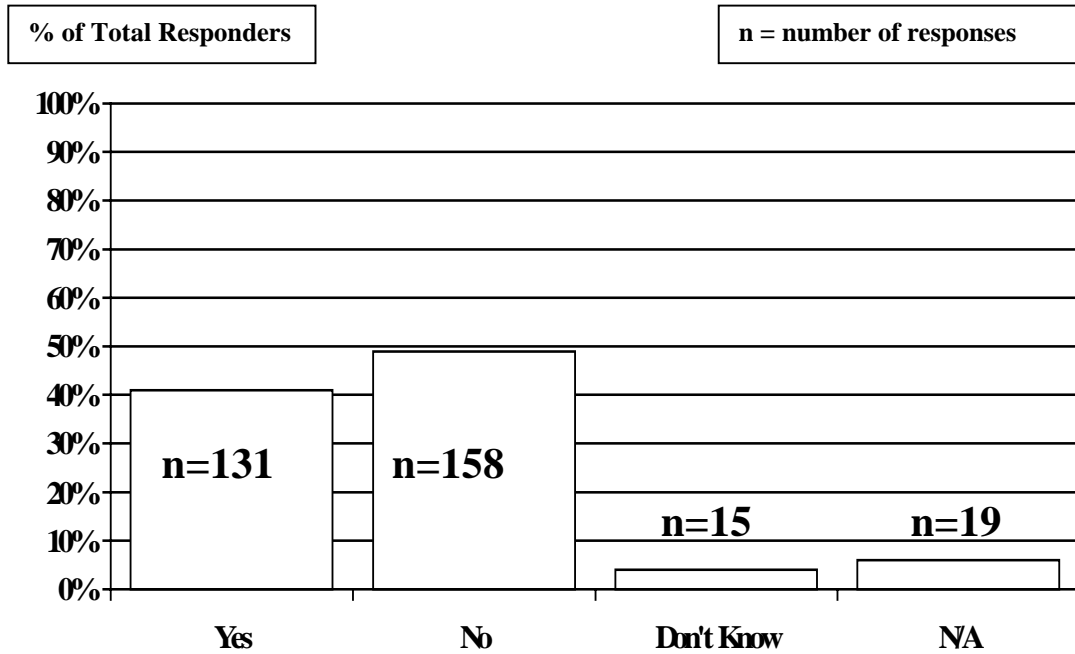
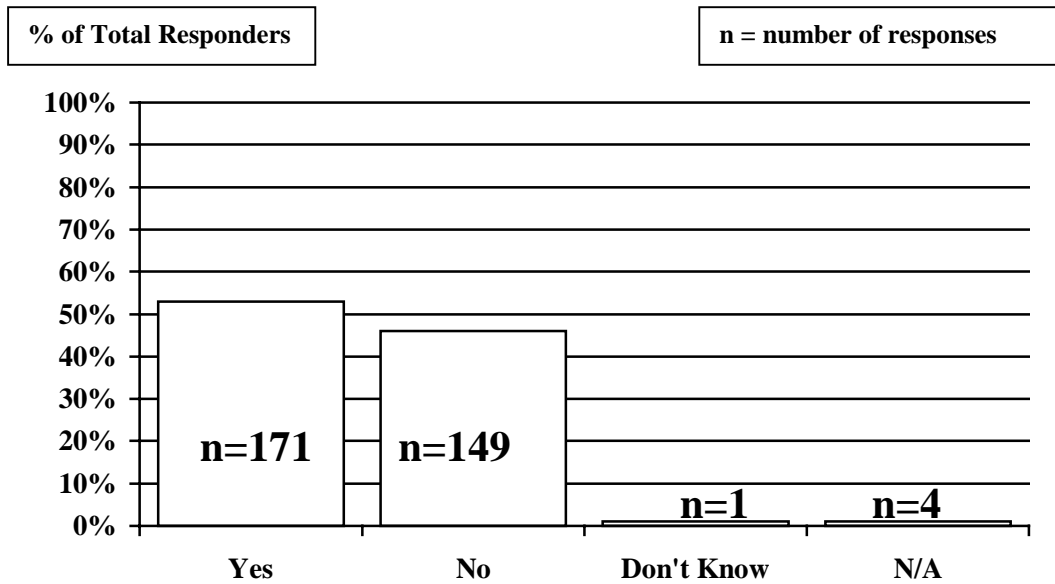
HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation Facility Type****Evaluation Level of Participation**

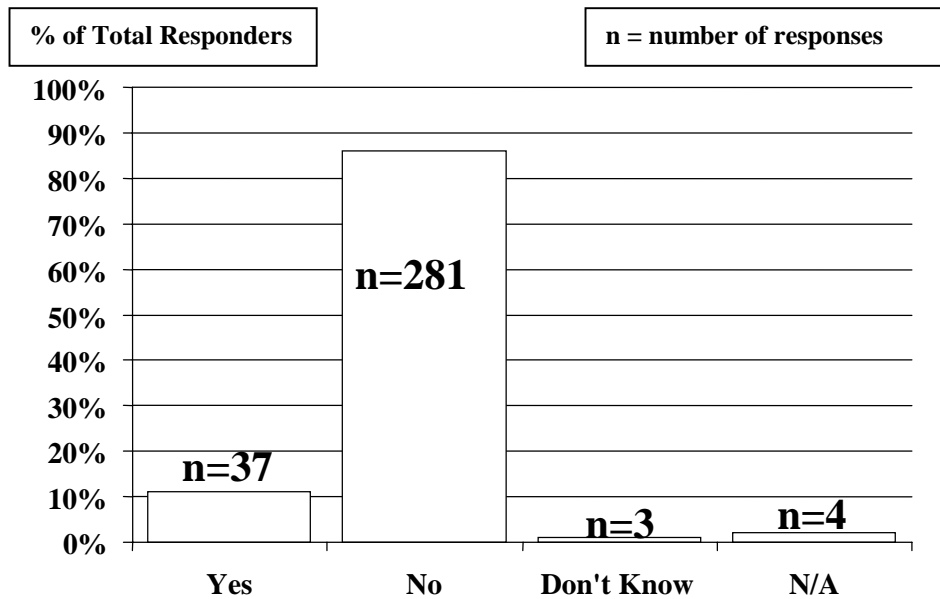
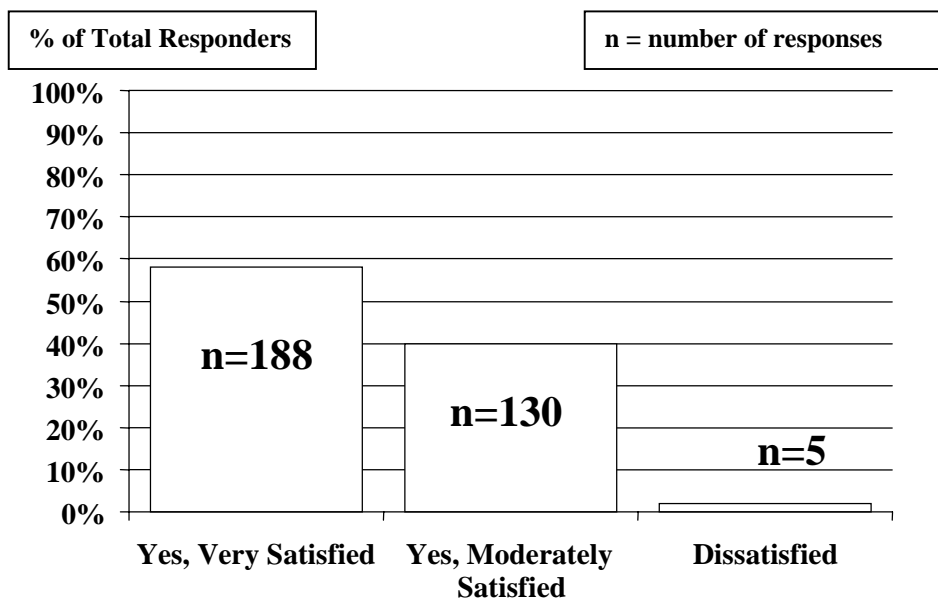
HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Activated Disaster Plan?****Evaluation
Is HEICS Part of the Disaster Plan?**

HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Test Backup Generator?****Evaluation
Use Alternative Communication?**

HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Simulate Computer Failure?****Evaluation
Simulate Facility Overcrowding?**

HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Decontaminate Patients?****Evaluation
Have Y2K Staff Lists?**

HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Alternative Communication with Ambulances?****Evaluation
Simulate Supply Shortages?**

HEALTHCARE FACILITY EXERCISE EVALUATIONS**Evaluation
Implement a Patient Evacuation?****Evaluation
Satisfied with Statewide Exercise?**

PERFORMANCE CRITIQUES AND EVALUATIONS

State Government Critiques

An overview critique was held with statewide government participants by telephone conference immediately after the exercise was concluded. That meeting included the JEOC and Control Cell staff, as well as the RDMHSs and OES Regional staff. The following is a summary of that discussion. Specific suggestions are categorized under the Recommendations section.

Internet Use

The overall capability was proven, and most counties were pleased with the new capability, even though there were some technical design and end user problems. The EMSA website summaries of NetRIMS data were a success, though some problems occurred in transferring some data sets from Region I. The use of a NetRIMS format would require:

- Better instructions, such as an online, printable how-to manual, as well as extensive training.
- Revised data gathered that has clearer terminology and value once gathered.
- Additional features so that new entries were not added to old ones.
- Prevention of double entries of the same data.
- Easier viewing of Regional totals and State totals.
- Easier viewing and reporting of the status of healthcare operations, as well as established protocols for healthcare so that the color code is used consistently, statewide.
- Better compatibility with the variety of computer platforms and Internet browsers.
- A database that has all of the medical facilities and ambulance providers in California.

Amateur Radio

In general, the use of HAM radio operations was successful. Many hospitals used HAM radio to contact their Operational Areas. A number of well-organized hospital radio networks have been active in certain urban areas for many years. Regions II-VI managed to eventually transmit data to the JEOC, which met the requirements of the exercise. Creative solutions were found between regions to assist with transmissions when problems arose. There were some technical issues about the process that need further resolution including:

- Clarification of who directs traffic as net control, and coordination with existing networks.
- Establishment of specific frequencies throughout the State to be used for healthcare information during a disaster.
- Terminology used for transmitting healthcare information needs to be standardized.
- Staffing for all of the HAM positions could be a challenge in a major, regional event that lasted for weeks.
- Establishment of transmission locations for RDMHSs (other than their offices) that utilize existing, proven HAM transmission capabilities.
- Longer lead times for working with the HAM community for exercises.
- Establishing guidance for the healthcare facilities about use of HAM operations, and how to acquire qualified, experienced operators who are covered under the Disaster Service Workers program.

Forms and Data Fields

The hospital and ambulance data collection forms were developed by the Exercise Steering Committee. The critique revealed that the data gathered, by both type and format, could be improved for future applications. This overall concern will be addressed in future coordination meetings with the private and public sectors. Specific requests for improvement included:

- Development of additional training for the use of any disaster forms.
- Use a position title for the form completion, not a name, which allows a 24-hour contact.
- Define protocols for identifying the facility status.
- Some fields need comment area to clarify what the data means, or expand on it.
- Ensure the difference in data in each column is clear so that there is less data entry error.
- Allow for identification of the type of facility (e.g., pediatric, adult care, etc.).
- Define how RDMHSs would use the ambulance data if public ambulance services were included (through the fire-fighting community), since they are not considered as part of the Medical Mutual Aid System.

Participation

The RDMHSs were asked to evaluate the overall participation by local government, hospitals and ambulance service providers. Their responses follow (1 being low, 10 being highest):

- Region I 10
- Region II 9
- Region III 9.5
- Region IV 8.5
- Region V 9
- Region VI 9

State OES Auxiliary Communications Service (ACS) evaluated statewide participation by HAM operators as a 9.5. EMSA's technical staff evaluated participation of those viewing the data sets on the EMSA website as high. There were as many as 40 viewers on the site at any given time.

Positive Responses

There were a number of strong supporting comments for the use of NetRIMS and the EMSA website, as well as the HAM radio operations. The capabilities of the communications systems were tested thoroughly. This will help to build more effective systems in the future. The amateur radio operators have built new, valued bridges within the healthcare community.

JEOC and Control Cell Evaluation

The JEOC was partially activated to monitor the NetRIMS and amateur radio performance, as well as to evaluate the data quality received in the exercise. A formal evaluation of the JEOC appears on page 27. A Control Cell was active in supporting technical challenges.

Regional and Operational Area Critiques

Each RDMHS provided a critique opportunity for their Operational Area participants. Because of the variety of approaches to gathering critique data, only broad comments can be provided. Specific suggestions are included in the Recommendation section. The following is a brief summary of the Regional critiques.

Exercise Performance

Overall, the exercise was successful because it was statewide in scope, which had never been attempted. However, government participants expected longer lead times for exercise design and implementation. They also stated that the compressed schedule frustrated hospitals, and almost all ambulance providers. It was also confusing to have exercise materials from multiple agencies and organizations. It was difficult to define the roles of specific players such as the RDMHSs and the OADMHCs (Operational Area Disaster Medical/Health Coordinator). Some Operational Areas also noted that there should have been mandatory activation of City EOCs and other participants.

Communications Testing

Though the exercise did test some of the communications capabilities, the path of information was not through channels currently being used, which reduced the usefulness of the exercise. Additional comments indicated there is interest in further development of an Internet-based data gathering system. This will require considerable revision of the NetRIMS forms and databases for them to be effective for disaster operations. Some found the use of the Internet was cumbersome for those used to the Response Information Management System (RIMS), an Intranet system often accessed through a T1 line. In addition, several Operational Areas also noted that Law Enforcement was interested in NetRIMS. For those using HAM radio communications, it was determined effective; but, the frequencies were too busy. Still, there is a strong desire to continue to use and develop HAM radio operations due to their strong performance during the exercise.

Forms and Data Fields

The design and use of the survey forms needs substantial revision, but the concept is of great value if it fits the actual hospital and ambulance provider's operations approach using healthcare terminology.

Acknowledgement of Participants

The healthcare participants were provided certificates. Government organizations that supported the healthcare community exercise were provided letters of appreciation.

JEOC Exercise Evaluation Summary*

Objective	Met	Unmet	Recommendations
Receive and evaluate NetRIMS hospital exercise data	Partially		The NetRIMS system had design problems for accepting new data, and the training of the users was inadequate. There were problems with double counting. These technical issues need to be addressed before using this format for an actual disaster response.
Maintain contact with the Regional Disaster Medical/Health Specialists (RDMHSs) via phone, radio, or other communications systems.		Not Met	Initial contact was not attempted, however, this was not an exercise scenario requirement.
Test CARES radio communications linkage to each region and ability to receive hospital exercise data from the RDMHSs	Met		The use of HAM radio was successful, and far more extensive than called for in the scenarios. This has promise for extended use into other healthcare operations such as blood banks.
Test Licensing and Certification (L&C) alternative communications using digital PCS or analog cellular telephones to communicate with district field offices.	Met		All but one district successfully used cell phones as a communications check. One district had their cell phone turned off.
Conduct limited training of JEOC staff		Not Met	Though some staff were given a tour of JEOC (ECC) operations, formal training was not provided due to the lack of scenario-driven operations to justify a formal training session. EMSA staff noted that JEOC procedures are under revision. There was limited guidance developed on the use of NetRIMS
Monitor RIMS for local and regional input on the SEMS reports training database.	Partially Met		Only one Operational Area used RIMS to report medical and health situational information. (This was an "allowed" objective base on local scenario needs.)

*Source: Independent Evaluator in the JEOC Original comments summarized for space considerations.

Response to the Evaluation: Many of the problems encountered were based on the compacted exercise schedule. Adequate training, technical design, and coordination issues could have been resolved with an exercise schedule of at least a year or more in length. All participants worked diligently to resolve problems.

RECOMMENDATIONS

Findings from the exercise fell into a number of categories. The recommendations for action are listed below each major category.

Coordination

1. In order to ensure maximum participation in large-scale exercises, participants need much longer lead times. This requires that schedules, exercise materials, and training guides be provided months before an event, with adequate time for corrections in the design and implementation.
2. A single source should be used for release of materials and guidance. If both public and private sector elements are involved, then the materials should come from a committee that is recognized as the coordination point for the exercise, and not from a variety of organizations.
3. A continuous, reliable source of information would be useful for all participants. A website, a newsletter, an 800 number phone system, fax on demand, or any number of resources could accomplish this. The participants at all levels want a single, consistent point of contact for planning for disasters in the healthcare community.
4. More of the healthcare community should be included in statewide exercises including clinics, blood banks, and members of the medical community (physicians and nurses) as well as the medical insurers and HMOs.
5. All participants in California healthcare need a more comprehensive understanding of other organization vulnerabilities. Without this knowledge, emergency-planning assumptions may be made which are not valid if primary and secondary partners are also impacted by a disaster. Both hospitals and ambulance service providers identified the need to define limitations and weaknesses of critical support elements outside their immediate organizations, and to describe how any reduced capacity might impact healthcare operations.

Emergency Public Information

Consistent, timely guidance for handling exercise public information is critical. The guidance provided for this exercise should be expanded and continued for all future exercises.

Communications and Communications Technology

1. The use of amateur radio is crucial for successful disaster communications in the healthcare community. All efforts should be taken to further strengthen and expand the use of HAM radio throughout the state by informing healthcare facilities how to appropriately organize and use volunteers, and by developing protocols and dedicated frequencies for healthcare operations during a disaster.

2. NetRIMS should be developed into a permanent system for healthcare disaster operations. It should also be evaluated by the RIMS Committee regarding continuity of reporting forms and functions with RIMS. Law Enforcement representatives should also be involved in these discussions, as well as representatives from the Fire Service who direct public service ambulance operations.
3. NetRIMS survey forms, and the NetRIMS entry and reporting structure, should be revised to match the needs of the end users, based on lessons learned in the exercise.

Procedures

1. NetRIMS procedures should be developed and distributed in a timely manner, as soon as the forms and the reporting design have been revised. These procedures should also be accessible online, within NetRIMS.
2. Specific procedures and guidance for use of amateur radio by healthcare facilities should be developed and distributed as soon as possible. These procedures should also be accessible online at the websites of the Exercise Steering Committee members.
3. Specific dedicated frequencies should be established on UHF and VHF, to be used strictly by the healthcare community and government for disaster communications.
4. Specific protocols and terminology should be developed for transmission of healthcare information on amateur radio.

Training

In order to ensure consistent performance during disaster response, a comprehensive training set should be developed and provided to all potential participants. The training set should include the following components:

- The day-to-day healthcare system in California, both private and public.
- The California Standardized Emergency Management System.
- The California Medical Mutual Aid System.
- Hospital Emergency Incident Command System (HEICS) and Incident Command System (ICS).
- The connections between the roles of government and private organizations during disaster.
- Who to contact in disaster situations.
- Critical information needed during disaster response activities.
- Communications systems available for sharing critical disaster information.
- Healthcare resource surveys and their use in disaster response.
- How to enter and track disaster information.
- Lessons learned from previous disasters, by disaster type.

Measuring Disaster Contingency Planning Readiness

The California Healthcare Association (CHA) (representing the acute care hospitals), and the California Ambulance Association (CAA) (representing private sector ambulances in California) both approached their constituents with a volunteer, anonymous Y2K readiness survey. These surveys were not part of the exercise, but they do shed light on related planning efforts needed to improve disaster response. The surveys were designed to measure Y2K emergency readiness as of August 1, 1999. The results reflect ongoing preparation activities that are expected to continue up to and through December 31, 1999. The questionnaire asked for levels of readiness in ranges from 0-25%, 25-50%, 50-75% and 76-100% in numerous categories. This is the most detailed healthcare preparation information, provided by healthcare facilities, currently available for an entire state.

California Healthcare Association Y2K Readiness Survey Results

The results of the CHA study was based on over 135 surveys returned from acute care facilities and systems. The results of the questions are provided in graphic form on the following pages. The following is a summary of survey highlights:

1. The survey returns reflected the various types of service areas. (Urban 39%, Suburban 23%, Rural 24%, Inner City 4%).
2. Hospitals of various bed capacities were included, with the largest number being in the 100 to 249 bed category (42%).
3. The survey had strong support from management (57% of surveys were completed by management).

A significant percentage of the respondents reported the following items were **at least 76% or more complete**:

- Y2K Contingency Plans of 75% of the respondents.
- Mitigation of their critical systems by 84% of the respondents.
- Physical plant contingency plans in place by 79% of the respondents.
- Biomedical and computer readiness by 87% of the respondents.
- Awareness of impacts caused by problems occurring to partners was only well known by 48% of the responders.
- Materials management and Pharmaceutical contingency plans by 76% of the respondents.
- People factor contingency plans by 69% of the respondents.
- Plans for response for Y2K related dates beyond January 1 by 81% of respondents.
- Plans to have additional staff on site and on call by 89% of respondents.
- A Y2K public relations/communications strategy by 68% of respondents.
- Due diligence processes, including legal assistance, by 75% of the respondents.

Recommendation

The next steps for healthcare facilities to take to improve contingency planning appear to focus on awareness of interdependencies in the California Healthcare community, preparing for staff impacts and challenges, strengthening their plans for key resource interruptions (i.e., pharmaceuticals), and preparing complete public relations and communications plan.

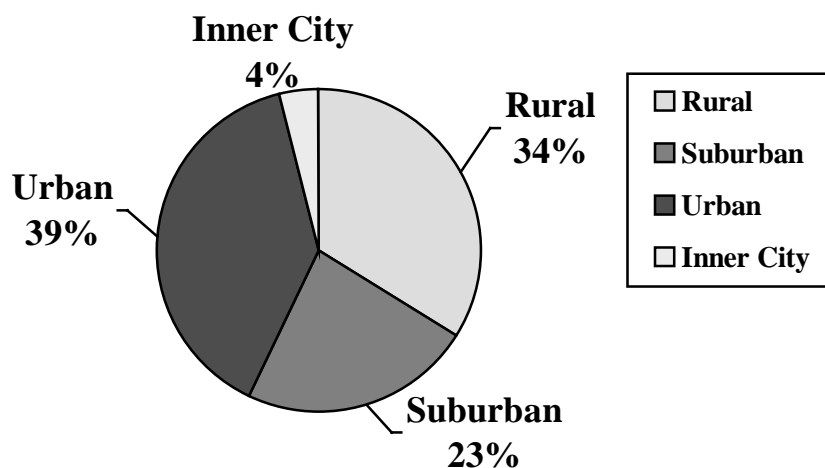
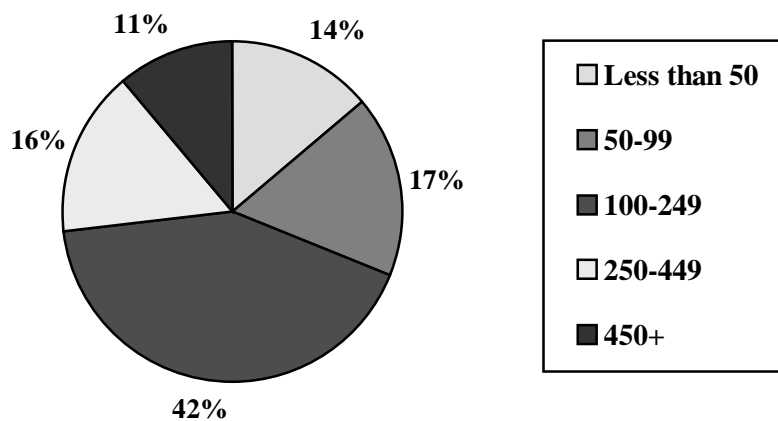
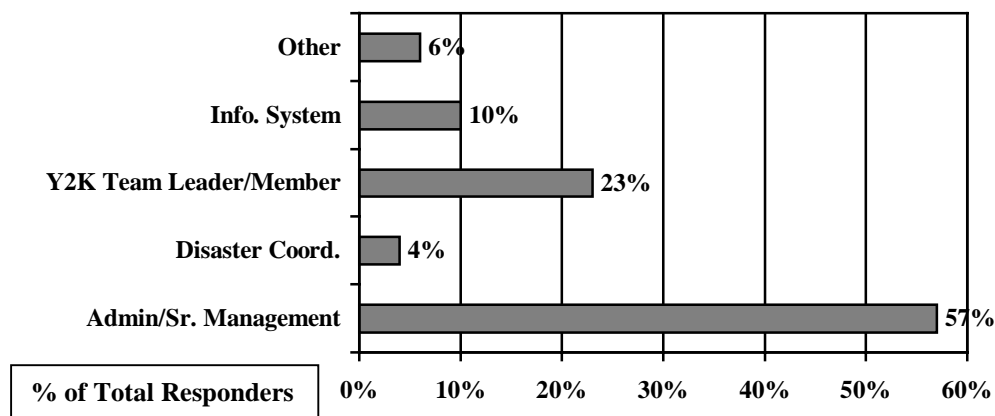
California Ambulance Association Y2K Readiness Survey Results

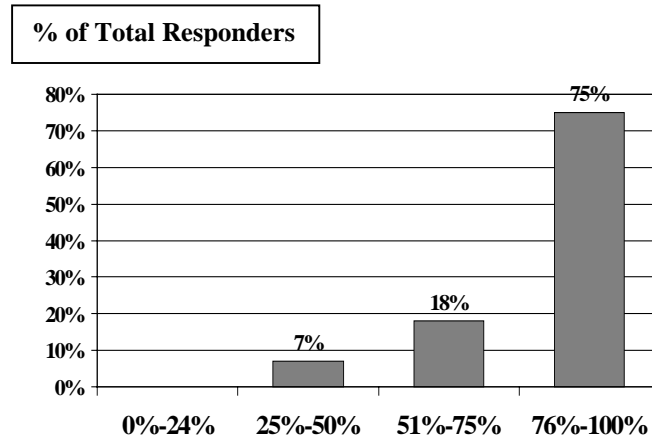
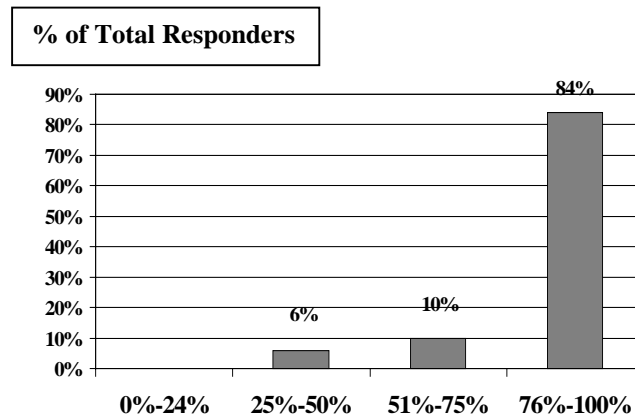
The CAA study had 37 surveys returned from some 237 mailings. The highlights of the CAA survey are summarized below:

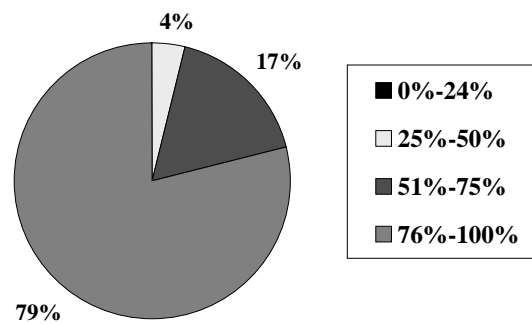
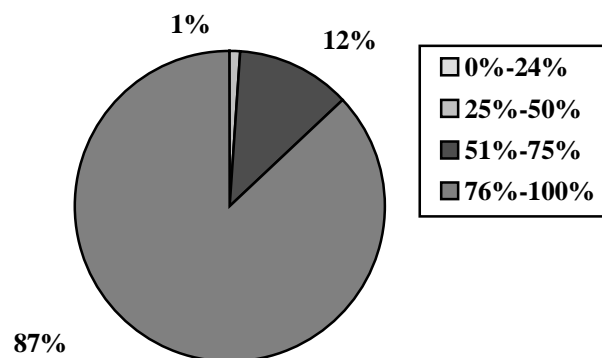
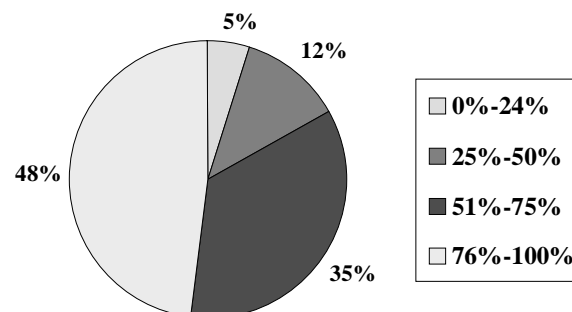
1. The survey returns were distributed throughout the various types of service areas. (Urban 35%, Suburban 27%, Rural 30%, Wilderness 8%).
2. The responding surveys were distributed fairly evenly throughout the six Mutual Aid Regions (I-6, II-11, III-5, IV-6, V-6, VI-3).
3. 76% of the respondents noted their Y2K contingency plans were more than $\frac{3}{4}$ complete on August 1, 1999. Similar numbers were reported for:
 - Assessing failures of their internal systems.
 - Assessing and planning for utility failures.
 - Ensuring biomedical and computer equipment was Y2K ready.
 - Planning for increased patient loads due to New Year's Eve activities.
 - Addressing staffing challenges.
 - Continuing progress on remaining issues.
 - Developing a media and public relations strategy.
 - Consulting with legal counsel.
4. The weaknesses identified in the current ambulance service disaster contingency planning appeared in two areas:
 - Evaluating impacts to their operations based on Y2K failures of business associates and partners in the healthcare community.
 - Evaluating the impact and planning for disruptions of critical operating supplies and pharmaceuticals.

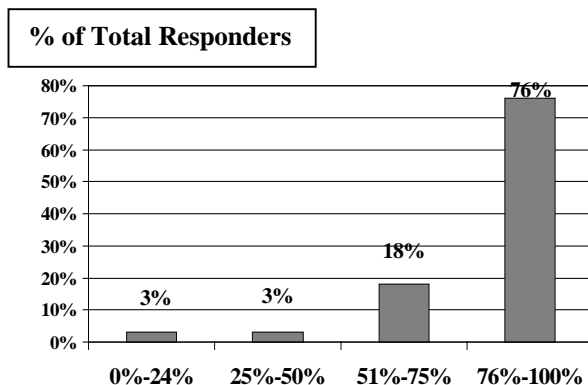
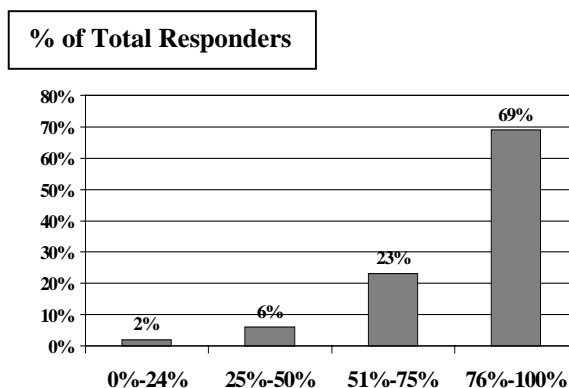
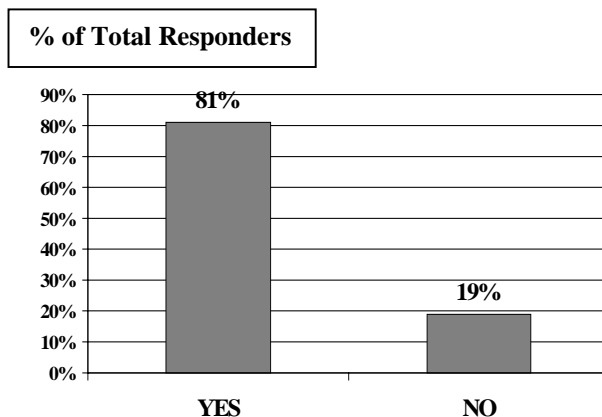
Recommendation

The next step for ambulance service providers to take to improve contingency planning appears to focus on awareness of interdependencies in the California healthcare community.

CALIFORNIA HEALTHCARE ASSOCIATION Y2K READINESS SURVEY RESULTS**Hospital Y2K Readiness Survey 135 participants****Participants by Bed Size of Facility****Survey Respondents**

CALIFORNIA HEALTHCARE ASSOCIATION Y2K READINESS SURVEY RESULTS**Y2K Contingency Plan Progress****Critical Internal Systems Mitigation**

CALIFORNIA HEALTHCARE ASSOCIATION Y2K READINESS SURVEY RESULTS**Physical Plant Contingency Plans****Biomedical and Computer Readiness****Health Care Partners Y2K Impact**

CALIFORNIA HEALTHCARE ASSOCIATION Y2K READINESS SURVEY RESULTS**Materials Management and Pharmaceutical Contingency Plans****“People Factor” Contingency Plans****Post-January 1, 2000 Contingency Plans**

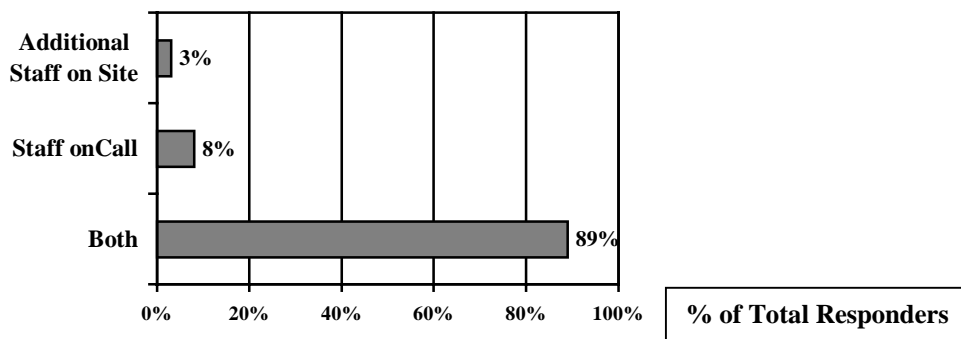
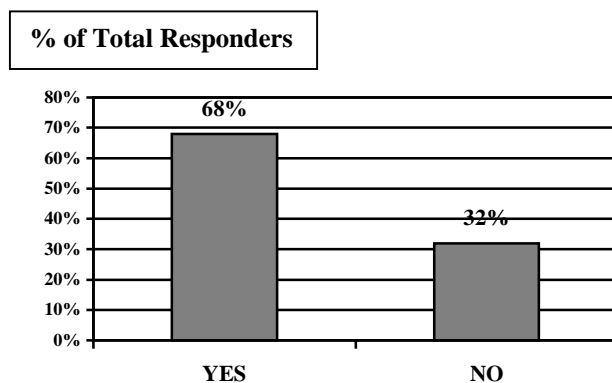
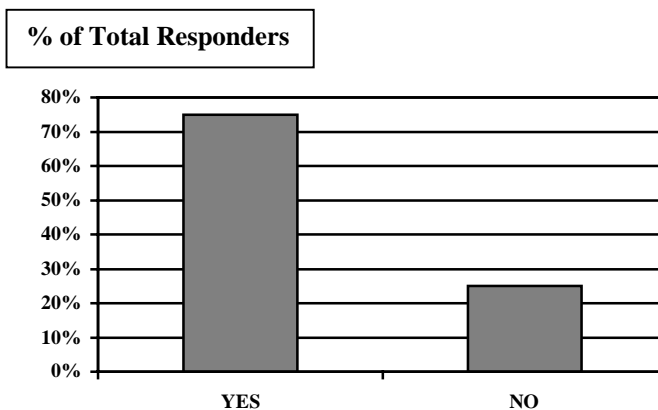
CALIFORNIA HEALTHCARE ASSOCIATION Y2K READINESS SURVEY RESULTS**December 31 - January 3 Staffing****Y2K Public Relations/Communications Strategy****Y2K Due Diligence**

DIAGRAM 1

CALIFORNIA MUTUAL AID REGIONS

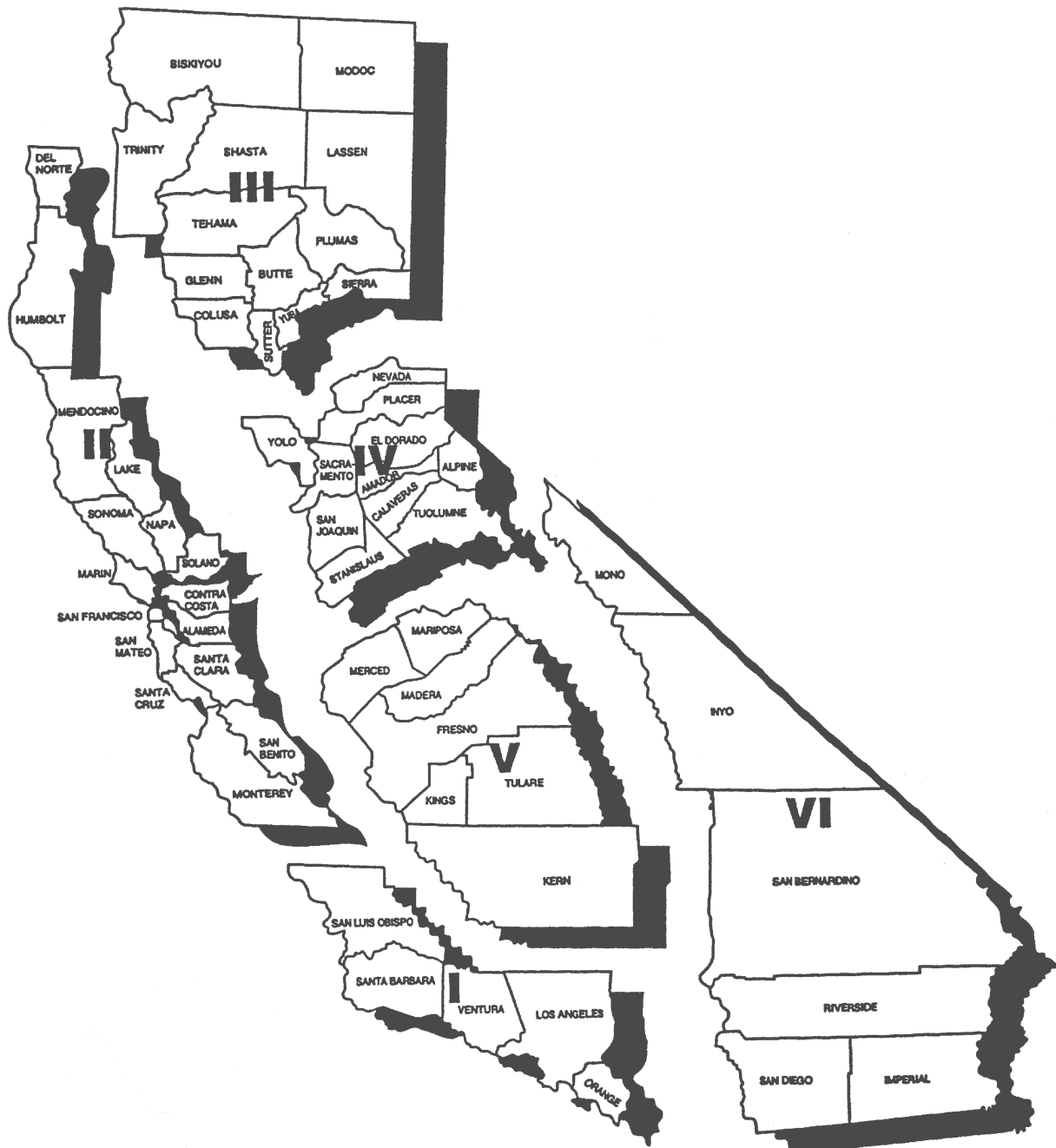
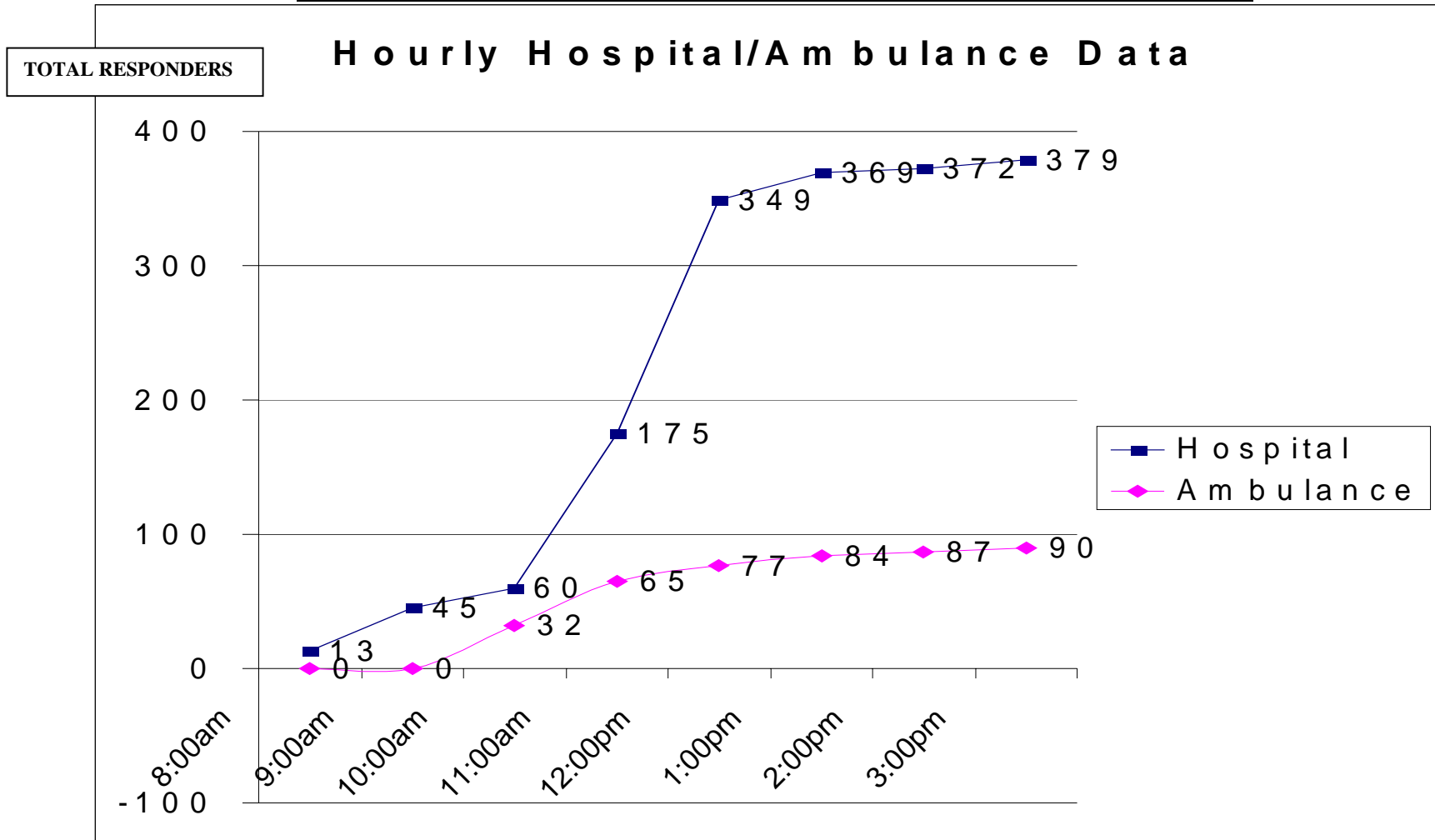


DIAGRAM 2

HOSPITAL AND AMBULANCE DATA ENTRY TRACKING



These numbers represent data received during the exercise. The final numbers are slightly higher due to data received after the exercise.